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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/816,177	03/26/2001	Masaaki Hatano	04329.2553	7586

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FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER
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EXAMINER

MITCHELL, JAMES M

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 06/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/816,177

Applicant(s)

MASAAKI HATANO

Examiner

James Mitchell

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 13-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 13-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1 The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 1, 2, 14 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Stamper et al. (U.S 2002/0053746).

3. Stamper (Fig 8; Par. 0069, Lines 13-18) discloses a Cu film (95) used as a wiring provided on a main surface (60) of a semiconductor substrate, an intermediate layer (134) formed at least on the Cu film, the intermediate layer comprising a TaN film at 40nm is 20nm or more formed on the Cu film and a Ta film formed on the TaN film and an Al film (132) formed on the Ta film and used as a pad, said intermediate layer comprising a first portion (bottom) which contacts said Cu film and a second portion (side) which does not contact said Cu but that is in contact with an insulating layer (129; Par. 0070, Lines 6-7); wherein said Al film having an extending portion under which the Cu film is not formed (extended portions of Al not covered by Cu film) and a conductive connection (139) member connected to the Al film.

4. Claims 1,2, 14 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Chittipeddi et al. (US 2001/0036716).
5. Chittipeddi (Fig 14, 18, 20; Claim 1) discloses a Cu film (44) used as a wiring provided on a main surface (11) of a semiconductor substrate, an intermediate layer (55) formed at least on the Cu film, the intermediate layer comprising a tan film formed on the Cu film comprising a 20nm or 40nm or more TaN film (Par. 0011) formed on the Cu film and a Ta film formed on the TaN film and an Al film (56) formed on the Ta film and used as a pad, said intermediate layer comprising a first portion (bottom) which contacts said Cu film and a second portion (side) which does not contact said Cu but that is in contact with an insulating layer (58) and a conductive connection (61) member connected to the Al film.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
7. Claims 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stamper et al. as applied to claim 1.
8. Stamper et al. does not appear to show that the thickness of the Ta film is 5nm or less.
9. In any event, the thickness of the film would have been obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine

experimentation and optimization to choose these particular dimensions, because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

10. Claims 16-22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stamper in combination with Galloway (US 5,783,868).

11. Stamper discloses the elements stated in paragraph 3, but does not appear to explicitly disclose a conductive connection member connected at an extending portion of the pad under which a copper film is not formed.

12. However (Fig 1) Galloway utilizes a conductive connection member (12) connected at an extending portion of the pad under which a copper film is not formed.

13. It would have been obvious to one of ordinary skill in the art to incorporate an extending portion to the pad of Stamper and to attach the conductive member to said extending portion in order to eliminate device damage as taught by Galloway (Abstract).

14. With respect to the claimed thickness, see paragraph 8.

15. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chittipeddi as applied to claim 1.
16. Chittipeddi does not appear to show that the thickness of the Ta film is 5nm or less.
17. In any case, see paragraph 8.
18. Claims 16-22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chittipeddi in combination with Galloway (US 5,783,868).
19. Chittipeddi discloses the elements stated in paragraph 5, but does not appear to explicitly disclose a conductive connection member connected at an extending portion of the pad under which a copper film is not formed.
20. However (Fig 1) Galloway utilizes a conductive connection member (12) connected at an extending portion of the pad under which a copper film is not formed.
21. It would have been obvious to one of ordinary skill in the art to incorporate an extending portion to the pad of Chittipeddi and to attach the conductive member to said extending portion in order to eliminate device damage as taught by Galloway (Abstract).

Response to Arguments

22. Applicant's arguments filed April 7, 2003 have been fully considered but they are not persuasive excluding claim 16. Any argument based on claim 16 is moot in view of the new grounds of rejection. Applicant has correctly indicated that Chittipeddi teaches that its barrier layer can be "100-1000 Angstroms". However, applicant view that Chittipeddi somehow does not teach the claimed limitation of a TaN film being 20nm or more is respectively traversed. Applicant's assertion that Chittipeddi does not teach the

claimed thickness is respectfully traversed. Paragraph 0011, which applicant has quoted explicitly discloses the claimed thickness of 20 nm or more.

23. Lastly, examiner would like to bring to the attention of applicant that its amendment filed October 18, 2002 contained an error. Applicant indicated that claims 1-13 and 15-22 were pending however claims 3-12 had already been canceled in its amendment filed April 22, 2002.

Conclusion

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Mitchell whose telephone number is (703) 305-0244. The examiner can normally be reached on M-F 10:30-8:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3230 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

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jam

June 1, 2003

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DAVID L. TALBOTT
SENIOR PATENT EXAMINER
FEDERAL BUREAU OF INVESTIGATION